

REVIEWS

Flora of North America North of Mexico. Volume I: Introduction. Edited by FLORA OF NORTH AMERICA EDITORIAL COMMITTEE. 1993. Oxford University Press, New York, xxi plus 372 pages. \$60, ISBN 0-19-505713-9 (v. I).

I expect John Torrey and Asa Gray shouted from the rooftops when Volumes I and II of the *Flora of North America North of Mexico* appeared in print late last fall, 1993. It is, after all, the beginning of the culmination of more than 160 years of botanical exploration, documentation, and analysis of the flora of the North American continent. However, the advent of this publication is not merely just the commencement of a 14-volume series of botanical nomenclature, taxonomy and phytogeography of a not insignificant portion of the western hemisphere. Nor will this publication in its entirety merely represent the end-product of an unfathomable amount of work by three generations of lay and professional botanists. The appearance of the *Flora of North America* is the clear expression of the continuing fascination of the evolution of the North American continent and its associated biota by an extraordinarily articulate cadre of scientists. I should think that Torrey and Gray would be bustin' proud.

The Flora of North America project began in 1965 following the Tenth International Botanical Congress in Edinburgh and the publication of Volume 1 of *Flora Europea*. But the initial attempts to produce a comprehensive flora for the North American continent floundered when the Smithsonian Institution and the National Science Foundation withdrew logistical and financial support in 1973. The project was reborn nine years later in 1982, and the Flora of North America (FNA) project now emanates primarily from the Missouri Botanical Garden. Eleven years after its rebirth, Volume I (reviewed below) and Volume II (Pteridophytes and Gymnosperms) were published.

Volume I consists of 15 essays collected into five parts. The volume begins initially with an introduction and history of the Flora of North America project, written by the principals Nancy Morin and Richard Spellenberg. This is an interesting essay on how the FNA project began, and why and where it is today. Part I, Physical Setting, contains a chapter on the climate and physiography by Luc Brouillet and David Whetstone (Chapter 1), and a chapter on soils by D. Steila (Chapter 2). Both are concise and clearly written discussions, in general well-illustrated by appropriate figures and tables. Some figures are a bit hard to decipher, as the more complex gray tones are not easily distinguishable from each other. For example, in Figure 1.11, differences in the major formations of bedrock geology are not clear, and this again is a problem in Figure 1.13 where physiographic provinces of North America are distinguishable only by name and not by symbol in the figure legend. This general lack of resolution does not seriously impair an otherwise extremely informative pair of articles.

What was clear from the reading of the first several chapters was the easy transitions from one chapter to the next. In essence, this volume does not suffer the fate of many other multi-authored texts, where variations in writing style and expression by different authors becomes bothersome to read in one sitting. Instead, the writing throughout Volume 1 is clear, elegant prose, and the Flora of North America Editorial Committee should be commended for the careful and consistent editing. I was hard-pressed to find even a typographical, much less grammatical, error.

Part II also contains two articles, Chapter 3 by Alan Graham on the history of the North American vegetation during the Late Cretaceous and Tertiary periods, and Chapter 4 by Paul and Hazel Delcourt on the paleological aspects of the climates and floras during the Late Quaternary. These are straight forward articles, and I found the extensive illustrations and explanatory captions extremely helpful. Those without a firm grasp of the geological history of our continent will be rewarded in spending time with this pair of articles.

Part III is the third duet of essays. Michael Barbour and Norman Christensen write about the contemporary vegetation (Chapter 5) and Robert Thorne discusses the phytogeographic patterns of North America (Chapter 6). I particularly liked Barbour and Christensen's explicit statement of the themes of their text, and that the article's organization included not just an overview of the major biomes, but also the regional variants. This format emphasizes the richness of our flora, as well as its distinctive organizational expressions. Photographs of the various vegetation zones range from adequate to excellent, but the purpose of illustration is always met, regardless. Some also might be a bit frustrated with a nomenclature in Chapter 5 that follows Munz (1968), not Hickman (1993) (e.g., *Stipa pulchra* = *Nassella pulchra*, *Rhus diversiloba* = *Toxicodendron diversilobum*), but such is the nature of botanical inquiry.

My favorite chapter was to be found in Part IV: Humankind and the Flora. In a characteristically perspicacious chapter entitled "Taxonomic botany and floristics," (Chapter 7), James Reveal and James Pringle bring our botanical heroes to life. This chapter is a wonderful tour through the history of botanical discovery in North America. I do not believe that anyone is left out, and the great number of photographs of the various personalities provides additional insight into each botanist. One can't help but pour over this essay and delight in putting a face to the detailed escapades of our botanical notables. Reveal and Pringle have written a delightful text.

Part IV of Volume 1 includes three other essays: Weeds by Ron Stuckey and Theodore Barkley (Chapter 8), Ethnobotany and Economic Botany by Charles Heiser, Jr. (Chapter 9), and Plant Conservation by George Yatskievych and Richard Spellenberg (Chapter 10). Chapter 8 on weeds briefly summarizes our current knowledge about "biological" weeds, and illustrates that many of our conspicuous botanical members harken from afar. Chapter 9 on ethnobotany was rather disappointing, given the rich botanical and anthropological lore of the North American continent. The topic was treated routinely, with headings like "narcotics," "hallucinogens," "stimulants," and "alcoholic beverages" treated in no more than four paragraphs. Medicines were also given short shrift, and Table 9.1 on the production of important crops of Canada and the U.S. seems a bit out of place. Chapter 10 on plant conservation begins with a discussion on the rationale for conserving species, and ends with on-going efforts at plant conservation at several organizational scales. Although the Appendix 10.1 is included presumably to illustrate the various kinds of plants threatened with extinction, it belies the magnitude of the problem. Chapters 8, 9, and 10 are enhanced by superb pen-and-ink drawings by some of the botanical world's better illustrators.

The final part, Part V, of Volume 1 provides critical background into the philosophy and rationale of the floristic treatments to come. Chapter 11 on species and genus concepts is written by G. Ledyard Stebbins, and it is characteristically thorough. Stebbins draws heavily from California examples to illustrate his points, but his pragmatic review is not hampered by a California-centric bias. His treatment of the importance of polyploid and apomictic species is particularly noteworthy, and I was also pleased with his discussion of species concepts. Although necessarily brief, he advocates the acceptance of a broader approach suggested by others (e.g., Levin 1979; Mishler and Donoghue 1982; etc.). In his classically elegant way, Stebbins suggests that "Nature forces botanists to adopt a pluralistic species concept" (239).

Warren Wagner and Alan Smith outline the ferns and fern allies of Volume II (Chapter 12), as does James Eckenwalder for the gymnosperms of Volume II in Chapter 13. Wagner and Smith systematically discuss the morphology, habitats, ecology, geography and classification of the Pteridophytes, and conclude with a candid "We still don't know[!]" in response to the long-asked question regarding why some sterile fern hybrids have undergone chromosome doubling to restore fertility and others have not (266). Both chapters 12 and 13 are elegantly illustrated with one-half page figures of North American pteridophytes and gymnosperms.

Arthur Cronquist details his system of classification of flowering plants as adopted by the *Flora of North America* (Chapter 14), adopting current terminology (e.g., apomorphic vs. plesiomorphic characters) that serves to ground the *FNA* in current

thinking. I had hoped to learn why Cronquist did not accept the recent work by Dahlgren and his colleagues (Dahlgren et al. 1985) on the taxonomy of the Liliaceae *sensu lato*, but I did not gain new insight. Volume I concludes with James Reveal's overview of flowering plant families (Chapter 15). Chapter 15 subsequently is followed by the very useful Appendix 15.1, a table outlining the taxonomy of the flowering plants according to the Cronquist system as adopted by the *Flora of North America*. The final appendix, Appendix 15.2, provides a table illustrating the concordance of family names accepted by the major systems of flowering plant classification systems.

As is customary to note, there are some distractions in the volume, but they are truly minor. Some, for example, might object to the large-size format and the hefty nature of the volumes. These are not strictly field books, but neither do I abuse my floras. For example, I would not backpack into the Sierra with a single *FNA* volume in my pack, but I will carefully stash the *FNA* in the back of my car when travelling to Montana collecting *Calochortus*.

Others may think that Volume I is unnecessary to have, in that it does not contain any diagnostic keys. This is far from true, as this text provides critical background and synthesis for understanding the philosophy, botanical traditions and assumptions that guide the development of the *Flora of North America*. As stated so eloquently by Reveal and Pringle in Chapter 8: "Most who pick up this and the subsequent volumes will find the history of systematics and floristics on every page, for each plant name has a story to tell. Those who look into that story will find wonderful rewards and an even greater appreciation of systematics" (192). I would add that the history of systematics and floristics of North America provided in Volume I are essential to the understanding and appreciation of each page of this botanical opus.

My parents maintained an extraordinary library in their home, full of books primarily on world geography and art history. These oversized books were kept on the lower shelves, mostly because their size and weight dictated such a place. As a child I spent hours lying on the floor, perusing their books to gain some extra insight into my parents' personalities, especially as to what gave them great joy and why they were so proud to be a part of humanity. I shall do likewise, and keep these volumes of the *Flora of North America* (and those to come) on the lower shelves of my library so that my children will have the same unspoken opportunities as I.

REFERENCES

- LEVIN, D. 1979. The nature of plant species. *Science* 204:381–384.
 DAHLGREN, R. M. T., H. T. CLIFFORD, and P. F. YOE. 1985. *The Families of the Monocotyledons*. Springer-Verlag, Berlin.
 MISHLER, B. D. and M. J. DONOGHUE. 1982. Species concepts: a case for pluralism. *Systematic Zoology* 31:491–503.
 MUNZ, P. A. 1968. *A California flora with supplement*. In collaboration with D. D. Keck. University of California Press, Berkeley.
 HICKMAN, J., ed. 1993. *The Jepson manual: higher plants of California*. University of California Press, Berkeley.

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A Natural History of California. (California Natural History Guides: 56). By ALLAN A. SCHOENHERR. 1992. University of California Press, Berkeley and Los Angeles. xi + 772 pages. \$38.00, ISBN 0-520-06921-8 (hardcover).

Allan A. Schoenherr, Professor of Ecology at Fullerton College for more than thirty years, avid traveler, and active advocate of rational environmental policy has prepared this splendid text that will enable all readers to quickly acquire substantive insight